Jan. 26, 1932. J. F. O'CONNOR 1,842,915

CAR CONSTRUCTION

Filed Sept. 12, 1929 3 Sheets-Sheet 1

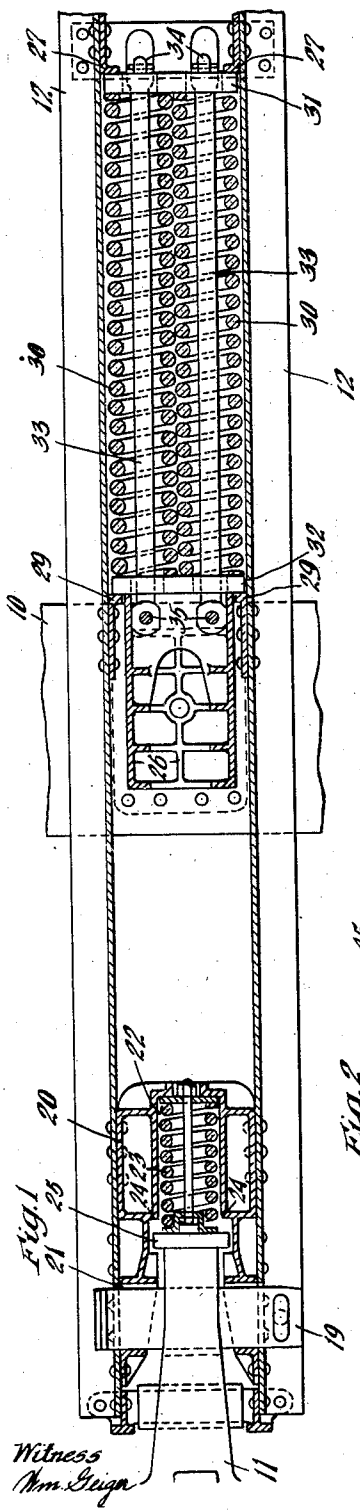


Fig. 1

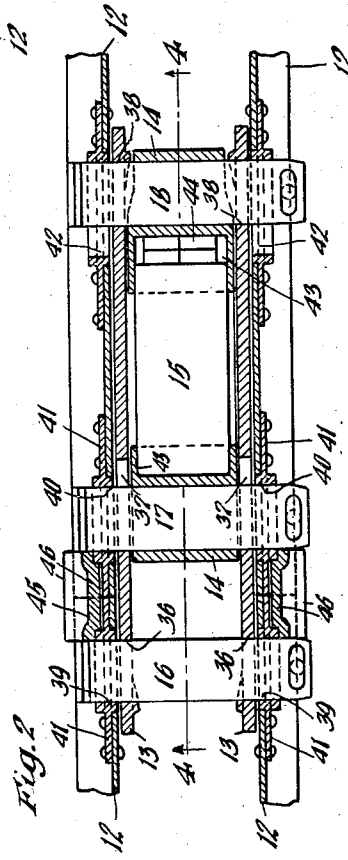


Fig. 2

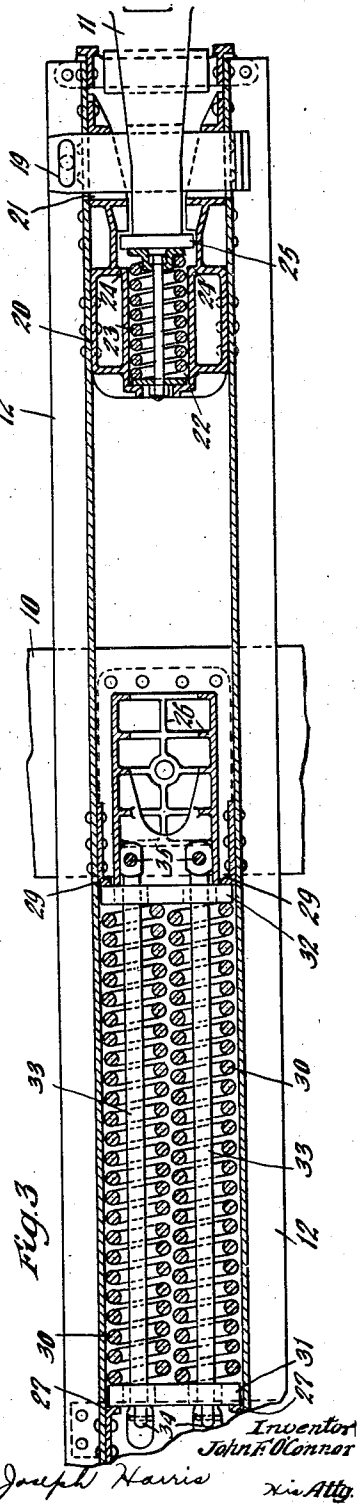


Fig. 3

Witness
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CAR CONSTRUCTION

Filed Sept. 12, 1929 3 Sheets-Sheet 2

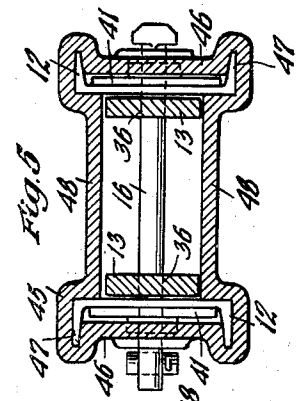


Fig. 5

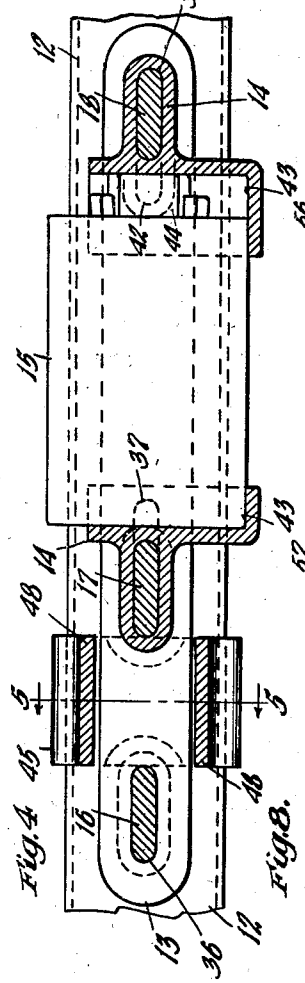


Fig. 4

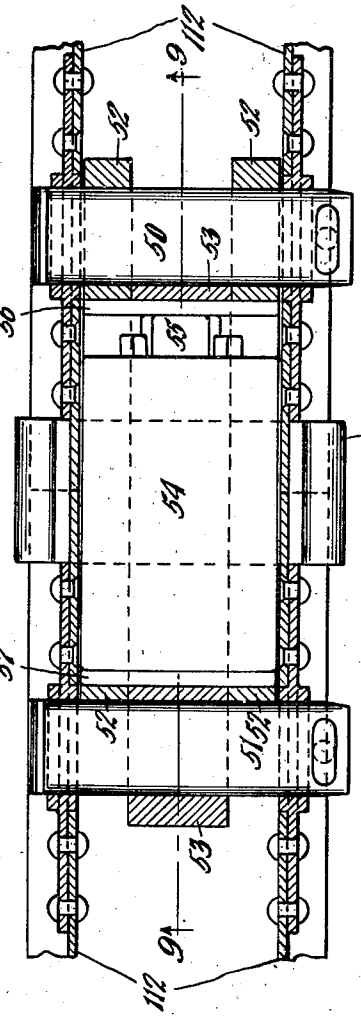


Fig. 8.

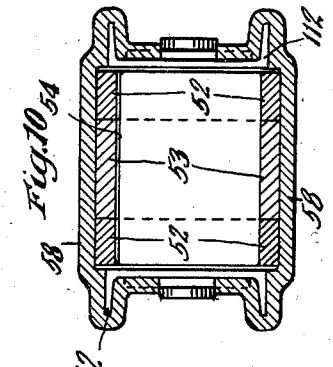


Fig. 10

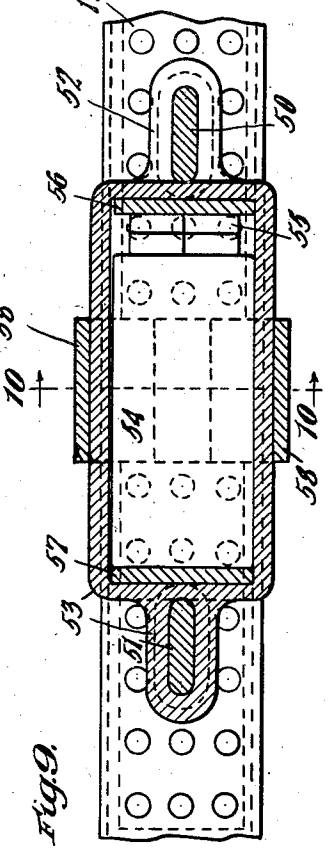


Fig. 9.

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CAR CONSTRUCTION

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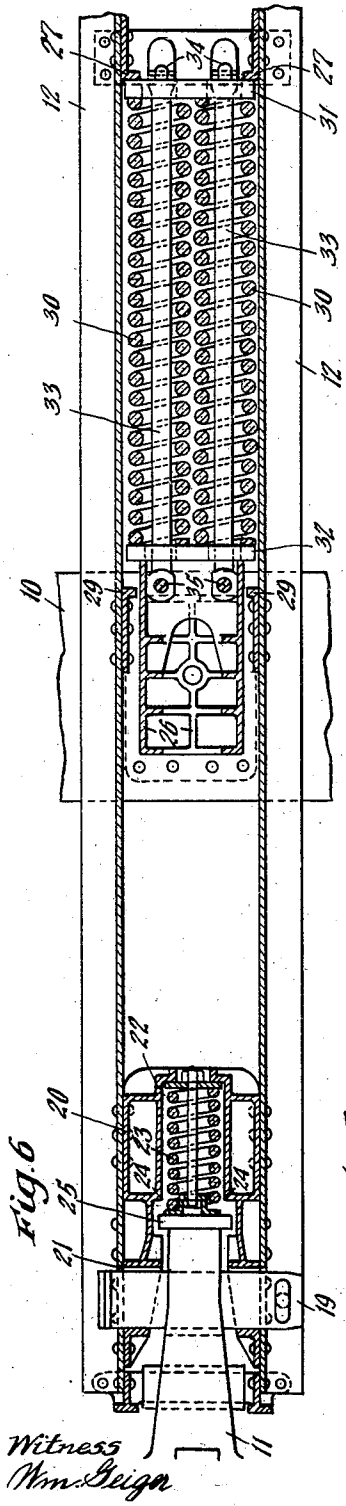


Fig. 6

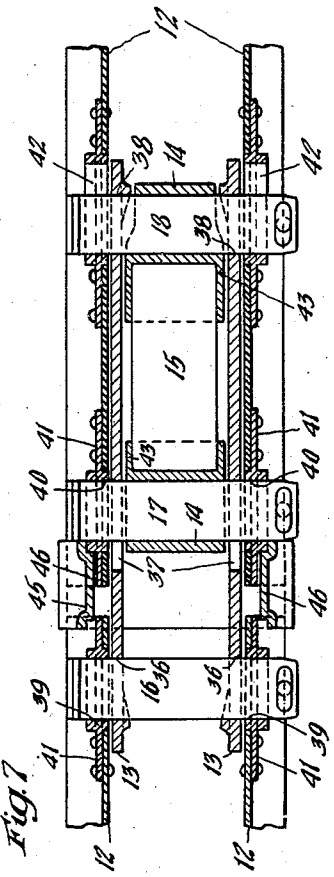


Fig. 7

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Patented Jan. 26, 1932 1,842,915

UNITED STATES PATENT OFFICE

JOHN F. O'CONNOR, OF CHICAGO, ILLINOIS, ASSIGNOR TO W. H. MINER, INC., OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

CAR CONSTRUCTION

Application filed September 12, 1929. Serial No. 392,015.

This invention relates to improvements in car construction.

One object of the invention is to provide a railway car construction wherein the car body is mounted to yield in a longitudinal direction with respect to means adapted to receive and transmit buffing and draft shocks, so as to effectively cushion the car against buffing and draft shocks, and wherein the means which transmits the buffing and draft shocks forms a rigid column during buff and is yieldingly extensible in a lengthwise direction when a pulling or draft action is applied to either end of the same, thereby facilitating starting of a train of cars.

Another object of the invention is to provide a car construction and railway draft rigging of the character indicated in the preceding paragraph, including longitudinally disposed draft sill members with reference to which the car body is longitudinally movabe to a predetermined extent, wherein cushioning means reacts between the sills and the car body, to yieldingly oppose relative movement therof during both buff and draft and the draft sills form a solid column opposing buffing blows and are themselves yieldingly extensible lengthwise of the car to cushion draft shocks.

A further object of the invention is to provide a railway car construction including coupler means at opposite ends of the car, a pair of spaced draft sill members connected to each coupler means extending lengthwise of the car and movable with respect to the car, the pair of sills connected to one of the coupler means abutting the pair of sills connected to the other coupler means to transmit buffing shocks from one pair of sills to the other, means yieldingly opposing separation of the two pairs of sills in draft, and means yieldingly opposing relative movement of each pair of sills and the car body.

A still further object of the invention is to provide a railway car construction of the character indicated in the preceding paragraph, wherein the pairs of sills are connected by means yieldingly opposing longitudinal separation of the same to take care of draft shocks, and the connecting means comprises a shock absorbing means and cooperating yoke-acting members connected respectively to two pairs of sill members.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings, forming a part of this specification, Figures 1, 2 and 3 are horizontal, longitudinal, sectional views through the underframe structure of a railway car illustrating my improvements in connection therewith, Figure 1 showing the structure at one end of the car, Figure 2 showing the structure at the central portion of the car, said figure being a continuation of Figure 1, and Figure 3 showing the other end of the car structure and being a continuation of Figure 2. Figure 4 is a longitudinal, vertical sectional view, on an enlarged scale, corresponding substantially to the line 4—4 of Figure 2. Figure 5 is a vertical, transverse, sectional view corresponding substantially to the line 5—5 of Figure 4. Figures 6 and 7 are views similar to Figures 1 and 2 illustrating the position assumed by the parts of the mechanism when under draft or pulling action. Figure 8 is a horizontal, longitudinal, sectional view similar to Figure 2 but illustrating a different embodiment of the invention. Figure 9 is a longitudinal, vertical, sectional view corresponding substantially to the line 9—9 of Figure 8. And Figure 10 is a vertical, transverse, sectional view corresponding substantially to the line 10—10 of Figure 9.

Referring first to the embodiment of the invention illustrated in Figures 1 to 7 inclusive, 10—10 indicate the body bolsters at opposite ends of a railway car, in connection with which my improved movable draft sill structure is slidingly supported. Coupler means of well known form is indicated by 11—11 and is connected to the opposite ends of the draft sill structure, the couplers being only partly shown, the head portions thereof being broken away.

My improved car construction, as shown in Figures 1 to 7 inclusive, comprises broadly two pairs of longitudinally disposed, spaced sill members 12—12 and 12—12, a pair of

yoke-acting plate members 13—13, a pair of end followers 14—14, a shock absorbing mechanism 15 and keys 16, 17 and 18.

The sill members 12—12 are arranged in pairs at opposite ends of the car, the same being preferably of the usual channel shape section and spaced the standard distance apart. Each pair of sills extends inwardly from the corresponding end of the car and the two pairs of sills have their inner ends normally in abutment as clearly shown in Figure 2. The coupler 11, at each end of the car, is connected to the corresponding pair of sills 12 by means of a coupler key 19 extending through the coupler shank and alined key-receiving openings in the sills 12—12. As shown, a casting 20 is disposed between each pair of sills 12 at the outer end thereof. The casting 20 forms a spacing and bracing member for the sills and is provided with transverse key-receiving openings 21—21 through which the coupler key 19 extends. At the inner end, the casting 20 is provided with a central pocket 22 in which a shock absorbing spring 23 is disposed. At the forward ends of the side walls of the pocket 22, shoulders 24—24 are provided which cooperate with a follower 25 interposed between the shock absorbing spring 23 and the butt end of the coupler shank. The shoulders 24 limit the inward movement of the follower 25, thereby limiting the amount of compression of the spring resistance 23. The normal spacing between the follower 25 and the shoulders 24 is preferably equal to the combined clearance between the front end wall of the key-receiving slot of the coupler shank and the coupler, and between the rear edge of the coupler key and the rear end walls of the key slots of the draft sills. As will be evident, outward movement of the coupler 11 is prevented by engagement of the key 19 with the front end walls of the key slots of the sills and the sills are movable with the coupler when a draft or pulling action is applied to the latter.

The pairs of sills 12 are slidably mounted with respect to the car body and the bolsters 10 thereof and the sills of each pair are disposed on opposite sides of the bolster filler casting 26 at the corresponding end of the car. Inwardly of the bolster filler casting, each pair of sills 12 is provided with fixed stop lugs 27—27 and the sills are braced at this point by a connecting spacing plate 28 secured to the bottom flanges of the sills. Outwardly of the stop lugs 27—27 and approximately at the location of the corresponding body bolster 10 the sills are provided with outer stop lugs 29—29 which are fixed thereto so as to move in unison with the sills. A pair of shock absorbing springs 30—30 are interposed between inner and outer follower members 31 and 32 which cooperate respectively with the stop lugs 27—27 and 29—29. The follower 31 is anchored to the bolster filler casting 26 by means of a pair of bars 33—33 extending through the coils of the springs 30 and through openings provided with the followers 31 and 32. At the inner ends, the bars 33 are provided with cotter pins 34—34 or other stop means extending therethrough which cooperates with the follower 31 to hold the same against inward or rearward movement. At the forward ends, the bars 33 are secured to the filler casting 26 in any suitable manner, and as herein shown are held by retaining pins 35—35 which extend through enlargements on the bars 33 and into suitable openings provided on the filler casting 26. As will be evident, when the sill members 12 are moved to the right, as shown in Figure 1, the follower 32 will be carried rearwardly by the stop lugs 29, thereby compressing the springs 30 against the follower 31, which is held stationary by the bars 33. When the sills are pulled outwardly or to the left as shown in Figure 6, the follower 31 will be pulled forwardly by the stop lugs 27 of the sills, thereby compressing the springs 30 against the follower 32 which is held against movement by engagement with the inner end of the stop casting 26.

As clearly shown in Figure 2, the inner ends of the pairs of sills 12 are normally in abutment. The two pairs of sills are connected by the yoke-acting plate members 13—13. As shown, the plate members are provided with alined sets of key-receiving openings 36—36, 37—37 and 38—38, adapted to receive the keys 16, 17 and 18 respectively. The key openings 36 are of such a size as to fit the key 16 and the draft sill members 12 at the lefthand end of the car, as shown in Figure 2, are provided with alined key-receiving openings 39—39 which fit the key 16 so that the key will at all times move with the sills 12. The key-receiving openings 37—37 of the members 13, which accommodate the key 17, are of greater length than the width of the key, as clearly shown in Figure 2, so that the members 13 and the key 17 have a certain amount of relative movement lengthwise of the car. The outer ends of the key 17 fit within key-receiving openings 40—40 provided at the inner ends of the sills 12—12 at the righthand end of the car as viewed in Figure 2. As will be evident, the key 17 is thus fixed with respect to these sills and will move with the same when the sills are actuated. The key-receiving openings 39 and 40 of the sills 12 are reinforced by suitable cheek plate members 41—41 of well known form, which are fixed to the draft sills in the usual manner.

The key 18 at the righthand end of Figure 2 substantially fits the key-receiving openings 38—38 of the members 13 so that this key will move with said members. The outer ends of the key 18 extend through key-receiving openings 42—42 provided in the draft

sills 12 at the righthand end of the car as seen in Figure 2, outwardly of the key-receiving openings 40 of said sills. As shown, the key-receiving openings 42 are of greater length than the width of the key 18 so that there will be relative movement between the key and the sills 12. As shown, in the normal position of the parts, the key 18 engages the outer end walls of the key-receiving openings 42—42, as most clearly shown in Figure 2.

The follower members 14—14 are disposed at opposite ends of the shock absorbing means 15, each follower being in the form of a block having a pocket 43 at the inner side thereof for a purpose hereinafter pointed out. The follower 14 at the lefthand end of the shock absorbing means 15, as viewed in Figure 2 is connected to the key 17, the follower being provided with a transverse opening which substantially fits the key, so that the follower and key move in unison. The follower 14 at the opposite end of the shock absorbing means 15 is connected to the key 18, the latter extending through a transverse opening in the follower which substantially fits the key so that the parts will move in unison.

The shock absorbing means 15, which is interposed between the followers 14, may be of any well known type, and as herein shown is in the form of a friction gear including a friction shell, cooperating friction shoes, and a wedge member 44. As will be understood, the usual spring resistance is disposed within the friction shell and yieldingly opposes inward movement of the friction shoes and wedge member. In Figure 2, the friction shock absorbing means is shown as so arranged that the wedge 44 is disposed at the righthand end of the same. The closed end of the friction shell of the shock absorbing means is disposed within the pocket 43 of the follower 14 at the corresponding end of the shock absorbing means and the wedge member 44 at the front end of the friction shell and the corresponding end of the shell are disposed within the pocket 43 of the other follower 14.

In order to maintain the inner ends of two pairs of sills in proper alinement, I provide a sleeve member 45 in the form of a band which embraces the inner ends of the sills and within which the same are telescoped. As most clearly illustrated in Figure 5, the band 45 comprises side members 46—46 which have top and bottom channel openings 47—47 adapted to accommodate the corresponding flanges of the sills 12 for sliding movement. The side members 46 are connected by horizontal webs 48—48 which are offset with respect to the top and bottom portions of the side members so as to provide pockets at the top and bottom portions of the sleeve in which the corresponding portions of the sills 12 slide. As clearly shown in Figure 5, the connecting webs 48 are spaced apart such a distance vertically that they form guide members for the yoke-acting plate members 13—13.

The operation of my improved car construction, as shown in Figures 1 to 7 inclusive, is as follows: Assuming that a pulling or draft action is applied to the coupler 11, as viewed in Figure 1, the sills 12 connected to this coupler will be pulled outwardly with the coupler, thereby compressing the springs 30 against the stop casting of the bolster 10, as hereinbefore pointed out, and as shown in Figure 6. During this action, the members 13 will also be pulled toward the left as viewed in Figure 7, by means of the connecting key 16. Inasmuch as the key 18 and follower 14, associated therewith, are movable in unison with the members 13, the shock absorbing means 15 will be compressed between the follower 14 referred to and the follower 14 connected to the key 17, movement of the latter being opposed by the connection of the key 17 with the sills 12—12 at the opposite end of the car. The combined draft sill structure comprising the two pairs of sills 12—12 and 12—12 will thus be elongated lengthwise of the car during a draft action, such elongation being yieldingly resisted by the shock absorbing means 15. The separation of the two pairs of sills will be limited upon compression of the friction shock absorbing means 15 to its limit, the relative movement of the followers 14 being arrested by engagement of the follower 14 associated with the key 18 with the corresponding end of the friction shell and shock absorbing means. The parts are preferably so proportioned that when the shock absorbing means 15 is fully compressed movement of the key 18 will be limited with respect to the sills 12 at the righthand end of the car, as viewed in Figure 7, by engagement with the end walls of the slots 42 of these sills. Movement of the members 13 at this time will also be arrested by engagement of the end walls of the slots 37—37 with the key 17 which is fixed to the sills 12—12 at the righthand end of the car.

During a buffing action, applied to the coupler 11 as viewed in Figure 1, the spring resistance 23 at the corresponding end of the pair of sills 12 will be first compressed. During compression of the spring, there will also be a tendency for the sills 12 to be moved to the right as seen in said figure. Compression of the spring 23 will be limited, as hereinbefore pointed out, by engagement of the inner edge of the coupler key 19 with the inner end walls of the key slots of the sills, whereupon the pairs of sills connected thereto will be forced to move inwardly or to the right as seen in Figure 1, in unison with the coupler 11. During the described movement of the sills 12, the springs 30—30 will be com-

pressed between the followers 32 and 31, as hereinbefore pointed out. Inasmuch as the inner ends of the pair of sills 12 referred to abut the inner ends of the other pair of sills, the latter will be moved to the right as viewed in Figures 1, 2 and 3, in unison with the other sills, the two pairs of sills thus acting as a solid column during a buffing action. As will be evident, when the two pairs of sills are moved in unison as a solid column during a buffing action, the springs 30—30 at both ends of the car will be simultaneously compressed without actuating the shock absorbing means 15.

Referring next to the embodiment of the invention illustrated in Figures 8, 9 and 10, the construction is similar to that disclosed in Figures 1 to 7 inclusive, with the exception that a different form of connecting means is employed between the two pairs of sills. In Figures 8, 9 and 10 the sills are designated by 112—112. The connecting means as shown in Figures 8, 9 and 10 includes a pair of keys 50 and 51, a pair of similar yoke members 52—52, a yoke member 53 and a shock absorbing means 54. The shock absorbing means 54 is similar to the means 15 hereinbefore described and is of the friction shell type including the usual wedge member and cooperating friction shoes. The wedge member of the friction shock absorbing means is indicated by the character 55 and cooperates with the follower plate 56. A follower plate 57 is preferably also interposed between the closed end of the friction shell of the shock absorbing means 54 and corresponding end sections of the yoke members 52—52. The yoke members 52—52 are secured to the sills 112—112 at the righthand end of the car, as viewed in Figure 6, by means of the key 50 so that the yoke members 52—52 will move in unison with said sills. The yoke members 52—52 are disposed on opposite sides of the yoke member 53 and comprise the usual loop sections within which the shock absorbing means 54 and the followers 56 and 57 are disposed. The yoke member 53 is fixed to the sills 112—112 at the lefthand end of the car as viewed in Figure 6 by means of the key 51 which extends through alined openings in the yoke in the sills 112—112. The yoke 53 is also provided with the usual loop portion which encloses the shock absorbing means 54 and the followers 56—57. The inner ends of the two pairs of sills are held in alinement by a sleeve member 58 within which the inner ends of the sills 112—112 are slidingly telescoped. The top and bottom arms or webs of the sleeve 58 are spaced apart such a distance vertically that they form guide means for the yoke members 52—52 and 53, the bottom web acting as a supporting means for said yoke members. As clearly shown in Figures 8 and 9, the inner ends of the two pairs of sills are normally in abutment, and buffing shocks will be transmitted from one pair of sills to the other in a manner similar to that described in connection with Figures 1 to 5 inclusive. During a draft action, the two pairs of sills will be separated relatively to each other lengthwise of the car in the same manner as the sills are separated in a draft action applied to the construction illustrated in Figures 1 to 7 inclusive, thereby compressing the shock absorbing means 54. Referring to Figures 8 and 9, assuming that a pulling action is applied to the pair of sills 112—112 at the lefthand end of said figure, the yoke member 53 will be pulled to the left, thereby actuating the follower 56 in a corresponding direction and compressing the friction shock absorbing means against the follower 57 which is held against movement with respect to the sills 112—112 at the other end of the car, by means of the yoke members 52—52 which are anchored to the last named sills. The relative separation of the two pairs of sills will be limited by the friction shock absorbing means reaching its limit of compression, that is when the follower 56 engages the corresponding end of the friction shell. When a draft or pulling action is applied to the pair of sills 112—112 at the righthand end of Figure 6, the yokes 52—52 will be moved to the right in unison therewith, actuating the follower 57 and compressing the friction shock absorbing means against the follower 56, which is held stationary with respect to the sills 112—112 at the opposite end of the car by means of the yoke 53.

In both forms of the invention hereinbefore described, the two pairs of sills, during a buffing action, act as a solid column, and the car body is movable relatively to the same to a considerable extent, relative movement of the pairs of sills and car body being yieldingly resisted by the springs reacting between the car body and sills. The entire cushioning shock in buff, except for the slight capacity afforded by the springs behind the couplers, is thus taken between the body and the sills by the interposed springs. As will be evident, the maximum amount of relative movement possible between the car body and pairs of sills is equal to the maximum full compression of the springs referred to.

In a draft action, the necessary slack for starting the cars is obtained by the single shock absorbing mechanism which opposes relative separation of the two pairs of sills, the amount of draft slack being limited by the amount of relative movement permitted between the two pairs of sills. The amount of relative separation of the two pairs of sills permitted is preferably at least such as to provide all of the slack advisable for starting the cars of the train. In addition to the shock absorbing capacity provided in draft by the compression of the shock absorbing

mechanism between the relatively movable sills, the car body is cushioned by the springs reacting between the pairs of sills and the car body, the additional amount of cushioning capacity thus obtained being equal to the cushioning capacity had in buff by relative movement between the car body and sills.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In car construction, the combination with coupler means at opposite ends of the car; of a draft sill member connected to each coupler and extending lengthwise of the car and abutting the draft sill member connected to the other coupler, each of said draft sill members being mounted for movement lengthwise of the car; cushioning means opposing relative movement of said draft sill members with respect to the car body; and means yieldingly opposing relative separation of said draft sill members lengthwise of the car.

2. In car construction, the combination with coupler means at opposite ends of the car; of a continuous draft sill structure connected to said couplers and extending lengthwise of the car, said structure and car body being relatively movable and said structure forming a solid column to resist buffing shocks applied to either end thereof, said continuous draft sill structure including a plurality of connected members adapted to be pulled apart upon a pulling or draft force being applied to either coupler; connecting means limiting separation of said members to a predetermined extent; means for yieldingly opposing separation of said members; and means yieldingly opposing relative movement of the draft sill structure and car body.

3. In car construction, the combination with coupler means at opposite ends of the car; of a draft sill member connected to each coupler, said draft sill member being movable lengthwise of the car; means yieldingly resisting relative movement of each draft sill member with respect to the car body in both buff and draft, said draft sill members being normally in abutment; and connecting means yieldingly resisting relative separation of said draft sill members.

4. In car construction, the combination with coupler means at opposite ends of the car; of a draft sill member connected to each coupler, each draft sill member extending lengthwise of the car and adapted to engage the other draft sill member in buff, whereby said draft sill members form a substantially rigid buffing column, said draft sill members being movable lengthwise with respect to the car body; means for yieldingly opposing movement of said sill members with reference to the car body; and means connected to said draft sill members yieldingly opposing relative separation thereof lengthwise of the car.

5. In car construction, the combination with coupler means at each end of the car; of a draft sill member connected to each coupler and extending lengthwise of the car, said sill members and car being relatively movable; means yieldingly resisting relative movement of said members and car; yoke-acting members connected with said sill members; and shock absorbing means cooperating with said yoke-acting means to yieldingly oppose relative movement of said sill members with reference to each other.

6. In car construction, the combination with coupler means at each end of the car; of a draft sill member connected to each coupler, said draft sill members extending lengthwise of the car and having their inner ends normally in abutment, said draft sill members being movably mounted on the car; means yieldingly opposing relative movement of said sill members and car body; and means yieldingly opposing longitudinal separation of said sill members, including a shock absorbing mechanism cooperating with end followers and means movable respectively with the sills for moving said followers toward each other when said sills are pulled apart to compress said shock absorbing mechanism.

7. In car construction, the combination with coupler means at each end of the car; of a draft sill member connected to each coupler, said draft sill members extending lengthwise of the car and having their inner ends normally in abutment, said draft sill members being movably mounted on the car; means yieldingly opposing relative movement of said sill members and car body; and means yieldingly opposing longitudinal separation of said sill members, including a shock absorbing mechanism and cooperating actuating means movable respectively with the sills for actuating said shock absorbing mechanism when said sills are pulled apart.

8. In car construction, the combination with coupler means at opposite ends of the car; of a pair of draft sills connected to each coupler, each pair of sills being mounted for movement lengthwise of the car; link means connecting the inner ends of the pairs of sills to limit relative separation thereof; a shock absorbing mechanism; end followers cooperating with said shock absorbing mechanism, one of said followers being fixed with respect to one of said pairs of sills for movement therewith during a draft action and the other follower being connected to the other pair of sills by said link means for movement in unison with said last named pair of sills during a draft action.

9. In car construction, the combination with coupler means at each end of the car; a pair of draft sills connected to each coupler, each pair of sills being movable lengthwise of the car; means yieldingly opposing relative movement of the sills with respect to the car body; means connecting the two pairs of sills including a pair of links fixed to one of said pairs and having a lost motion connection with the sills of the other pair, a key fixed to said last named pair of sills and a second key connected to the pair of links, and an end follower cooperating with each key; and shock absorbing means interposed between the end followers, actuated thereby upon relative approach of said followers to yieldingly oppose longitudinal separation of said pairs of sills.

10. In car construction, the combination with a floating draft sill structure including two pairs of sills; of means for connecting the inner ends of the sills of said two pairs, including a pair of link members, a key extending through one set of ends of said link members and the corresponding ends of the sills of one of said pairs and connecting said link to said pair of sills for movement in unison therewith, a second key extending through the opposite ends of said links and through the sill members of the other pair and having a lost motion connection with the latter; a third key fixed to the sills of said last named pair and spaced from said second named key; follower means cooperating with said second and third named keys; and shock absorbing means interposed between said follower members.

11. In car construction, the combination with a car body; of coupler means at opposite ends of the car, all of said coupler means being movable as a unit with respect to the car body in buff, all of said coupler means being also movable with respect to the car body in draft, and said coupler means at opposite ends of the car being relatively movable with respect to each other during draft; means for yieldingly resisting relative movement of all the coupler means and car body in both buff and draft; and a single shock absorbing means opposing relative movement of said coupler means at opposite ends of the car with reference to each other.

12. In car construction, the combination with a car body; of coupler means at each end of the car; draft sill means connected to said couplers, said draft sill means being movable with respect to the car body in both buff and draft and acting as a solid column member in buff; means yieldingly opposing relative movement of the draft sill means and car body in both buff and draft, said coupler means at opposite ends of the car being separable with respect to each other lengthwise of the car in draft; and shock absorbing means common to both coupler means opposing relative separation of the same in draft.

13. In car construction, the combination with couplers at opposite ends of the car; of draft sill means connected to the couplers and acting as a solid column in buff to transmit buffing shocks from one coupler to the other, said draft sill means being movable with respect to the car body in both buff and draft; cushioning means opposing relative movement of the draft sill means and car body in both buff and draft, said couplers being relatively separable lengthwise of the car, in draft, to such an extent at least as to provide the necessary slack in starting the cars of a train; and means yieldingly opposing separation of said couplers.

In witness that I claim the foregoing I have hereunto subscribed my name this 10th day of September 1929.

JOHN F. O'CONNOR.